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FEEDING DAIRY COWS AND CALVES

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Foreword

"If short of hay in the winter, straw or corn fodder can be used, but a deficiency of grass in the pasture is such a sin against good sense that nature refuses a substitute."

"It is easy to understand what kind of pasture the farmer has, who objects to shade, and claims his stock does better without it. The poor animal must travel from blade to blade all day in the hot sun and never know the satisfaction of a full stomach. But upon a luxuriant pasture, set with a variety of grasses, the cow fairly stretches her mouth to see how many tender leaves she can take in at once; she eats and eats till she fairly groans, then she sees another tempting bunch and says, 'I must have a little of that dessert. These clover salads and sweet scented vernal jams are too delicious to leave.' Then she goes to the shade and works her immense stomach full of material into milk which has no fever in it. By and by she looks out on the pasture and says, 'I must take another turn at those viands. They are too tempting for resistance.' And she fills her stomach again and stretches, and eats a little more and, finally, when driven home at night, she occasionally turns her head to one side of the path and takes a mouthful half clandestinely, as a boy sometimes slips an orange into his pocket when leaving a grand dinner. Such pastures make good cattle."

—Dr. Seaman A. Knapp.

Feeding Dairy Cows and Calves

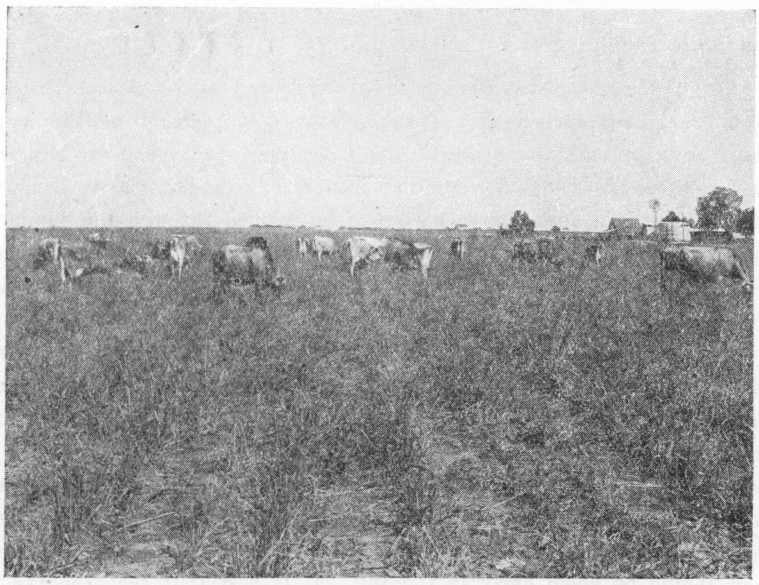
J. L. Thomas, Extension Dairyman

Cotton has pushed Texas grazing lands into cultivation for 50 years or more. The movement has not abated. In recent years large ranches have been cut up into small cotton farms, and the latest estimates show that 70 per cent of the agricultural values of the state are produced by cotton. The continued lowering of cotton yields in the older lands, and the low prices received have, however, combined to start a movement toward livestock farming. In this new yet old system that the future Texas will probably see develop, the dairy cow and other forms of livestock will play a big part. Everything springs from the soil and in farming, thoughts never travel very far away from it. Feed is fruit of the soil, and on its wise use in proper combinations and quantities depends, to a large degree, the profit and pleasure in the dairy business.

Roughages

The dairy cow requires roughage.

Roughage is a feed term used to describe feed of a bulky character, such as hays, fodders, silage, pasture, straw and cottonseed hulls.



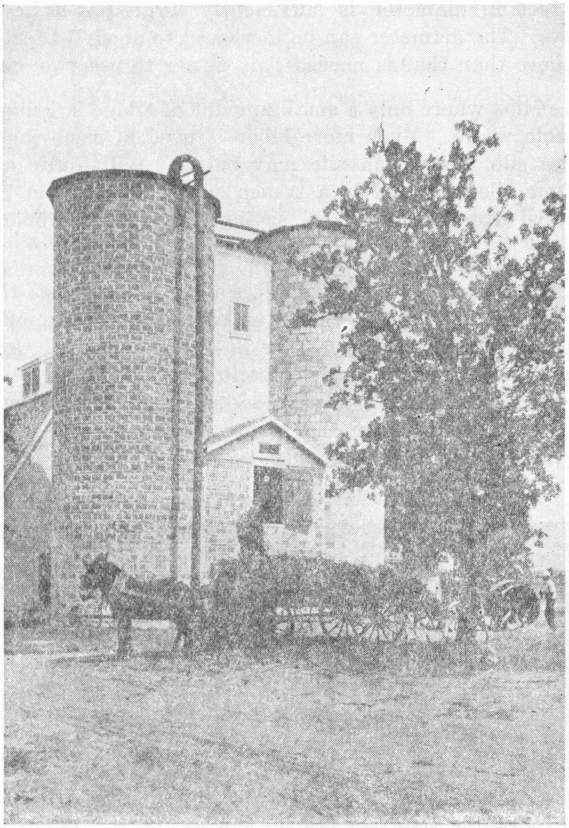
Sudan grass pasture increases butterfat production

Roughage may be divided two ways: (1) into dry and succulent roughage, (2) into high and low protein roughage. Dry roughages are the hays, fodder, straws, and cottonseed hulls . Succulent roughages are the pastures, root crops, soiling crops and silage. High protein roughages are the legume hays and green pastures. Low protein roughages are dry pastures, grass hays, fodders, straws and hulls.

Permanent and Temporary Pastures

Pastures are the cheapest source of succulent feed, and a good pasture with good cows will yield more cash returns than most cultivated crops. Pastures are of two kinds; permanent and temporary. A permanent pasture is land sown to a combination of grasses and clovers which do not all grow at the same time of the year, so that something will be growing on the ground for as many months in the year as climate and moisture will permit. Native grass alone will not make a permanent pasture, since it grows for only a few months in the year. In the Central and Western portion of Texas it is necessary to rely on temporary pasture as a supplement to the native grasses. Sudan grass for the spring grazing in rotation with the small grains for the winter pasture have proven to be the best where the rainfall is comparatively light. In most of the eastern parts of the state permanent pastures can be made by combining Bermuda grass, dallis grass and carpet grass with lespedeza for summer grazing and rescue grass, rye grass, bur clover and white Dutch clover for winter pasture.

Temporary pastures are those grown for a single season, having to be replanted each year. These pastures supplement and in some cases have to take the place of the permanent pasture. For summer pasture there is perhaps no crop that is superior to sudan grass. Farmers should plant one acre for each cow to be carried through the summer. Sweet clover makes an excellent temporary pasture. It has a longer grazing period than sudan grass. Its drawback is that a stand is not always assured. It is planted earlier than sudan grass, however, and if a stand is not secured sudan grass may be sown later. For late fall and winter pastures, small grains and such things as winter peas, vetch, and yellow sweet clover are used. In South Texas, oats, and barley are the small grains that are preferred. Yellow annual sweet clover is grown quite extensively on the heavy lands close to the Gulf Coast. In the northern part of the state, wheat, barley, rye, winter peas and vetch are used. To get the most grazing from these small grain pastures, they should be sown early in the fall. It is best that the seeed be in the ground by the middle of September.



Have a silo built to suit the needs of the herd

Silage and Soiling Crops

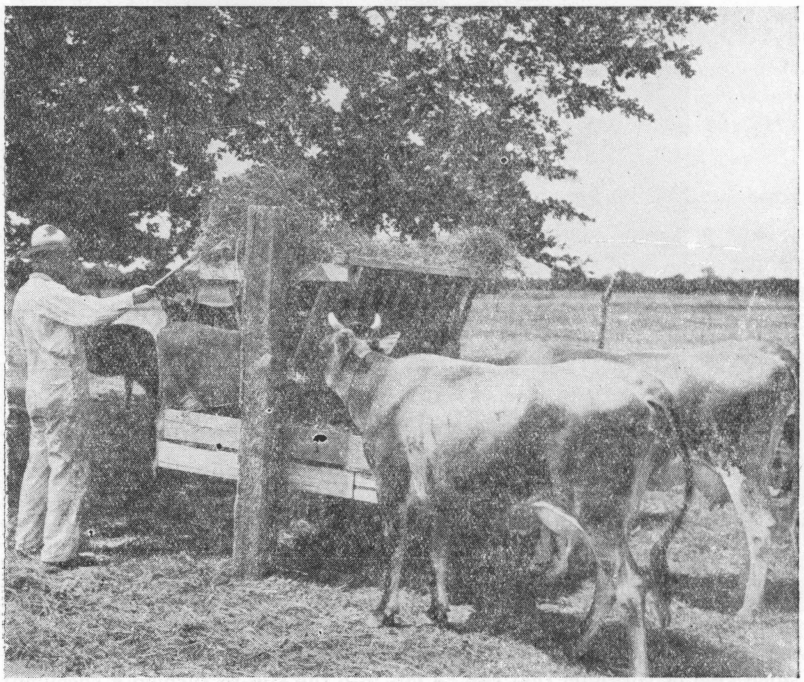
For best results, succulent feed must be supplied at all times of the year. In most parts of the state there are times when pastures will not supply this need for green succulent feed and a substitute must be used. For herds of 10 or more cows in any part of the state, the silo can be used to solve this problem of a succulent feed supply.

There are few, if any, growing seasons in any section where there is not enough moisture at some time during the season to produce a crop of some kind of sorghum that can be put into the silo to furnish a succulent feed supply when it is needed. The silo should be built to suit the needs of the herd, because in order to keep silage in good condition in the silo while

feeding, two or three inches should be removed from the surface each day. A silo 10 feet in diameter is sufficiently large for a herd of from 10 to 15 cows. The diameter can be increased to about 14 feet for larger herds. If more than that is needed it is better to use two smaller ones.

In large silos where only a small amount of silage is being fed, there is considerable waste. Much more labor is used in removing the silage from a large silo. A trench silo may be used with quite satisfactory results. Some silage is lost in a trench silo, more than in the circular type, but it is often the means of saving a crop that would otherwise be lost.

For the man who has a small herd, soiling crops (feeds that are cut and fed green) or root crops, will have to be depended upon to supply the succulent feeds when the pasture is dry and short. Corn fodders and sorghums are generally used for soiling crops. The root crops that are most generally used for this purpose, are stock beets or sugar beets. They may be planted early in the spring, harvested and fed as needed during the latter part of the summer.



Feed hay the year around

Hays and Fodders

When we have done a good job in supplying succulent feed for the dairy cow, we have not yet furnished her all the roughage she needs. In addition to the succulent feed a cow will consume nearly a ton of hay each year. The amount of hay needed will depend upon the length of the pasture season, and the quality of the pasture. Cows should be given access to hay while they are on pasture.

Dairy cows prefer legume hays to grass hays but if a legume hay is not available, then the cows should certainly be fed a grass or cane hay. Legume hays are higher in protein and mineral content than are grass hays which makes them more useful as milk producers, and for this reason they are preferred in the feeding of dairy cows. The farmer should select the legume that will do best in his locality and put up a ton for each cow. The more common legume hays are alfalfa, cow peas, soy beans and peanuts. Sweet clover is sometimes used as a hay crop.

Concentrates

Dairy cows need concentrates.

Roughage is not the only feed necessary to profitable dairying. Dry roughage is so bulky and succulent roughage has so much moisture, that a cow cannot eat enough of it to supply the needs of her body and produce a large flow of milk over a long period of time. Therefore she must have her roughage ration supplemented with some of the grain and mill feeds which together are called "concentrates." These require less space in the digestive tract of the animal for the nutrients supplied. Concentrates are also divided into high and low protein feeds and when a low protein roughage such as cane hay is fed, a high protein content is needed in the concentrate feed to supply the deficiency in the roughage. When a high protein roughage like alfalfa is fed, a lower protein content in the concentrate may be used.

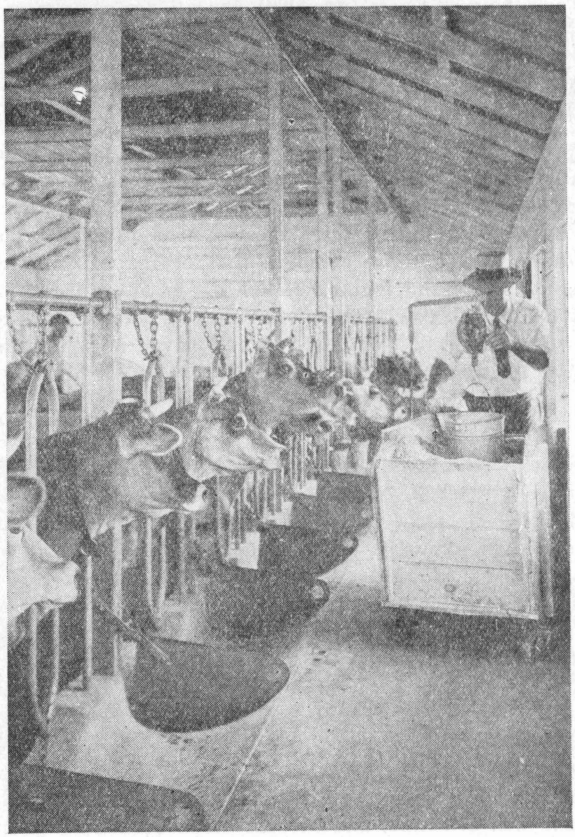
In practical feeding on the farm, if the animal is furnished all the roughage she will consume, and the protein dificiencies are made up in the concentrates, the feeder need not worry much about the supply of carbohydrates and fats in the ration. With green feed and legume roughage available, mostly home grown grain feeds can be used with just enough high protein mill feeds to bring the digestible protein content of the mixture up to 12% or 15%. Such a mixture can be made of:

400 pounds of ground ear corn, or grain sorghum heads.
100 pounds of cottonseed meal.

Feed grain according to production

A roughage ration made up of green grass and sorghum fodder would require a little more protein in the ration. A mixture of:

300 pounds of ground corn or grain sorghum heads.
100 pounds of wheat bran.
100 pounds of cottonseed meal.



may be used. It is also good where comparatively dry pasture and legume hays make up the roughage.

If the roughage is silage and sorghum fodders a high percentage of protein will be required in the concentrate mixture, since both roughages are low and the mixture should be made to contain 18 to 20% protein, and can be made up of:

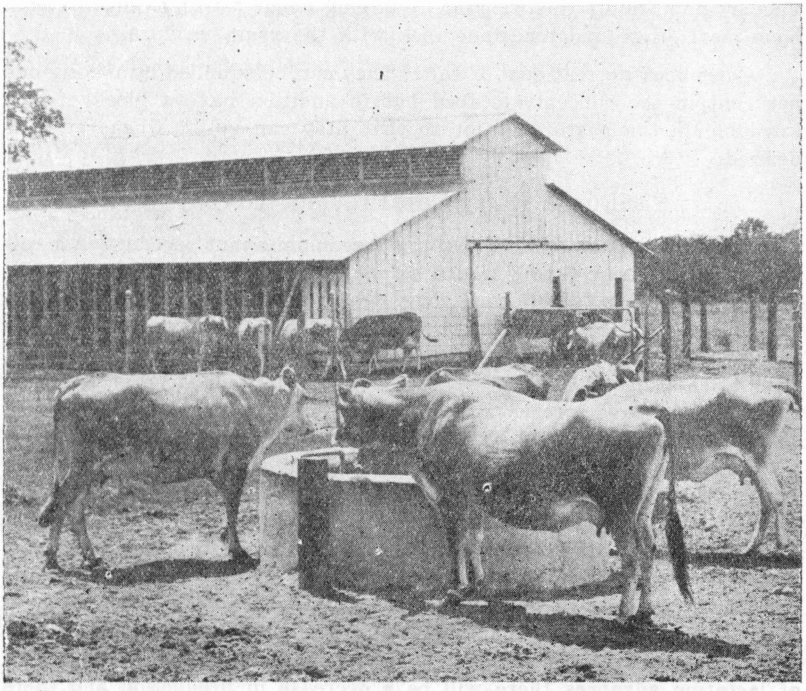
300 pounds of ground ear corn or grain sorghum heads.
100 pounds of ground oats.
100 pounds of wheat bran.
300 pounds of cottonseed meal.

If the roughage is of low quality such as cottonseed hulls, and prairie hay, a 22% mixture should be used to supply the deficiency, and this can be made up of:

200 pounds of ground ear corn or grain sorghum heads.
100 pounds of ground oats.
200 pounds of wheat bran.
300 pounds of cottonseed meal.

The last roughage ration given cannot be expected to give results with high producing cows. For cows to continue with high production a better quality of roughage is needed than the last one named. If hay alone is used as a roughage, a cow will need about two pounds for each 100 pounds of live weight. If the cow be fed silage and hay, she will take about three pounds of silage and one pound of hay for every 100 pounds of live weight.

Concentrates for the dairy cow should be more or less bulky. This bulk may be supplied by feeding a finely ground concentrate mixture over silage, or mixing it with a small amount of ground roughage or a ittle cottonseed hulls. Some bulk in the mixture is necessary to get all the concentrate mixture into the cow's paunch.



Water—pure and plenty— is a necessity

Water

The dairy cow needs water.

Milk itself is from 86 to 88% water, and the cow requires a large amount of water to soften up and digest her feeds, and to supply the necessary moisture for the body. Water should always be available for the dairy cow. If the dairy cow does not have all the water she desires, the effect will show in the milk pail. Do not compel cows to go any great distance to secure water. They will go thirsty and the result will be a lower milk production. Earthen tanks do not furnish a good water supply. They become very stale and filthy in the summer time. Water should be supplied from a well or from a running stream.

Minerals

The dairy cow needs minerals.

Most of the feeds given dairy cows, with the exception of legume hay, are rather low in minerals. Milk has a rather high mineral content, and in order to supply this mineral for the milk, and maintain the body-requirement, more mineral is necessary for the cow than for other animals. Feeders now supply this mineral by mixing about two per cent of steam bone meal or ground limestone rock with the grain mixture.

Cows need a great deal of salt. They can be supplied by mixing one per cent in the concentrate feed but in addition have a block of salt available in the pasture or lot so that htey can get it whenever it is desired.

Feeding A Dairy Cow Previous To Calving

Experience has proven that for a maximum annual production a cow should be dry from 6 to 8 weeks before calving, during which time she should be liberaly fed on good roughage, in pasture if possible, and on grain feeds that are non heat-producing, such as bran and oats. Corn may be used very sparingly as a fat producer that she may be in good flesh at the time of calving. A cow should be in good flesh at this time that she may have a reserve supply of material in her body from which to make milk during the first few days after calving, when she is in a feverish and more or less weakened condition and should receive little grain except a cooling and laxative feed such as bran. As soon as the feverish condition has passed the regular grain ration should be resumed, 4 to 5 pounds per day at first gradually increased until one pound of the grain mixture is fed for every 2½ to 3 pounds of milk produced. While the cow is gaining in milk flow, the grain ration should be increased in proportion. When the maximum milk flow is reached it should be kept as nearly constant for as long a time as possible, but as the period of lactation advances there will be a decrease in production and there should be a corresponding decrease in the grain ration fed.

How To Feed A Dairy Calf

No phase of dairy work is less understood and more generally neglected than that of properly feeding and caring for calves when they are taken from the cows and placed on a ration of skim milk and grain feed. As a result of this neglect a large percentage of the dairymen of the state lose a great many calves during the first few weeks after birth. Other dairymen who take centain precautions in feeding and caring for their calves, are raising them without loss or even detrimental effects from scours or other early troubles.

Milk is the ideal feed for young calves, but it is too costly. They can be reare das well on skim milk and grain feed, which furnishes the fat in much cheaper form. Skim milk differs from whole milk only in having had most of the fat removed. Owing to the removal of the fat, skim milk is a much more nitrogenous feed than whole milk having a nutritive ratio of 1 to 1.5 as compared with 1 to 4.4 for unskimmed milk. Failing to appreciate this fact, some dairymen are supplementing skim milk with nitrogenous concentrates, such as linseed meal, and wheat bran. It is evident, however, that in skim milk supplement, the need is not for additional protein, but for an abundance of energy-giving carbohydrates or fat to replace the fat that has been removed from the milk. Good feeds for this purpose are corn or grain sorghums.

Young calves should be allowed to get their milk from the dam for two to three days. Many dairymen never allow the calf to draw milk from the mother claiming that if separated at once the calf learns more readily to drink from a pail. Nevertheless, the calf should always get the first milk (colostrum) which is destined by nature for cleansing the bowels and starting the digestive functions. If the cow is a heavy milker, the calf should not be allowed to gorge the milk, as it will result in indigestion and scours. The young calf has a small stomach and naturally takes milk frequently and in small quantities.

When the milk feeding begins, small calves should be given six pounds per day of their mother's milk for the first day or two, divided between two feedings. Larger calves should be given more according to their size and vigor. In all cases the milk should be fed as fresh as possible and at blood heat, the temperature being determined by a thermometer, which most careful feeders use. The amount of milk given should be gradually increased although we should avoid overfeeding the small calf at all times as it is often the cause of scours and poor success in calf-raising.

Teaching the young calf to drink is the first step toward success in raising dairy calves

When a calf is from 2 to 4 weeks old (the exact age depending on its vitality) skim milk may gradually replace the whole milk. Substitute ½ pound of skim milk at each feeding until the change has been completely made, taking a week or 10 days to make the change. The skim milk may be increased as follows for the average calf; four pounds at a feed when five weeks of age; five pounds at seven weeks; six pounds when nine weeks; seven pounds at 10 weeks; and eight pounds at 12 weeks. The feed should not exceed nine or 10 pounds at a feeding during the skim milk period, which often lasts from six to eight months.

At feeding time hand-reared calves should be confined in stanchions for a short time after the milk is drunk until they consume their grain feed and overcome the desire to suck each other's ears and udders. They are also fed more easily and in a more satisfactory manner when confined in stanchions than when allowed to run loose. When this precaution is neglected the shape of the udder may be injured and the heifer may persist in sucking herself or others.

When calves are about two weeks old they should be taught to eat some grain feed such as a mixture of two pounds of corn or maize chops and one pound of wheat bran. At six weeks of age a calf will usually eat one-half pound of this mixture per day; at two months of age about one pound a day; at three months of age about two pounds a day. Gradually increase until the calf is receiving three pound a day at six months of age. In addition to this it should have all the clean clover or alfalfa hay that it will eat. Calves will begin to eat hay at about the same age as they do grain and they consume about the same quantity of each at first, but as the calf grows and its paunch or stomach develops, the proportion of roughage to concentrates should be increased until six months of age, at which time it will be comsuming about three times as much hay as grain.

Calves should be supplied with abundance of pure fresh water at all times. This is often neglected but should be attended to, as calves from two to three months of age consume an average of about 10 pounds of water daily. As soon as the calf begins to eat grain and hay, it should be given salt the same as other animals.

When a calf is dropped in the barn or in the cowlot, the navel of the calf should be washed with an antiseptic soution and tied with a silk thread immediately after birth, in order to prevent navel infection. Should the calf be dropped in pasture or on a clean place, this precaution is not necessary.

The thrifty calf should gain from 1½ to 2 pounds a day for the first four to six months when properly fed on skim milk along with suitable grain and roughage in a liberal supply. Do not endeavor to fatten the calf but keep it in a vigorous growing condition building strong bone and muscles. When skim milk calves do not do well it is generally because of improper care such as lack of sunlight and fresh air, feeding at irregular intervals, feeding cold or stale milk, feeding from pails that have not been scalded daily, feeding concentrates and allowing the excess to ferment and stale in the feed box.

In many sections of the state all the milk is being sold from the farm to milk products manufacturing plants. In such cases there is no skim milk left on the farm to feed the calves. Many farmers are now purchasing skim milk powder, using one pound of powder to nine pounds of water to make the skim milk with which to feed their calves.

After the calf becomes older, the skim milk powder may be mixed with the grain feed and fed dry.

Table of Protein, Carbohydrate and Fat Content

Roughage

Name	Protein	Carbohydrates	Fat
Alfalfa hay	10.6	39.0	0.9
Cowpea hay	12.6	34.6	1.3
Soy bean hay	11.7	39.2	1.2
Peanut hay	6.9	45.3	2.5
Corn stover	2.1	42.4	0.7
Corn husks	0.6	47.3	0.3
Kafir stover (dry)	1.7	43.1	1.3
Cane hay	2.8	44.8	2.0
Johnson grass hay	2.9	45.0	1.0
Sudan grass hay	3.7	45.7	0.9
Bermuda grass hay	3.7	37.9	0.8
German millet	4.8	49.7	1.7
Oat hay	4.5	38.1	1.7

Concentrates

Name	Protein	Carbohydrates	Fat
Cottonseed meal	37.0	21.8	8.6
Soy bean meal	39.7	34.7	4.5
Corn and cob-meal	6.1	63.7	3.7
Corn meal	7.4	66.6	4.5
Milo grain	8.7	66.2	2.2
Milo head chops	6.3	58.1	1.9
Barley	9.0	66.8	1.6
Oats	9.7	52.1	3.8
Wheat bran	12.5	31.6	3.0
Corn bran	5.8	56.9	4.6

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Other Dairy Literature On Request To Extension Service, College Station:

C-66 Judging Dairy Cows.
C-73 Better Pastures For East Texas.
B-59 Dairy Barn Plans.
B-49 Silo Construction.

Farmers'	Bulletin	1626	Feeding Dairy Cows
"	"	1443	Dairy Cattle Breeds.
"	"	1422	Udder Diseases of Dairy Cows.
"	"	1604	Dairy-Herd-Improvement Associations.
"	"	1412	Care and Management of Dairy Bulls.
"	"	1610	Dairy Farming for Beginners.
"	"	876	Making Butter On The Farm.
"	"	1451	Making and Using Cottage Cheese in the Home.
"	"	602	Production of Clean Milk.
"	"	1532	Dairy-Herd-Improvement through Cooperative Bull Associations.
"	"	1473	Washing and Sterilizing Farm Milk Utensils.
"	"	1315	Cleaning Milking Machines.
U. S. D. A.	Circular	No. 99	Judging Dairy Cattle.
U. S. D. A.	Leaflet	No. 14	Daising the Dairy Hiefer.
U. S. D. A.	Leaflet	No. 10	Care of the Dairy Cow at Calving Time.
U. S. D. A.	Leaflet	No. 3	Improved Sanitation in Milk Production.
U. S. D. A.	Leaflet	No. 7	Feeding Dairy Cows in Summer.

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